DOCUMENT RESUME

ED 136 243 CS 003 301

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TITLE Differences in Reading Strategies between Good and Poor Readers.
PUB DATE 76
NOTE 56p.

EDRS PRICE MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS Context Clues; Grade 10; Language Styles; Literature Appreciation; *Problem Solving; *Reading Comprehension; Reading Difficulty; *Reading Interests; *Reading Processes; *Reading Research; Secondary Education; Theories

ABSTRACT

Responses and strategies used by good and poor readers are compared in their reading of material which varied in writing style and interest. Twenty-four tenth-grade subjects described their thoughts and behavior during silent reading. From the protocols, 13 types of reader responses were identified and organized into a taxonomy of word-, clause-, and story level responses. Nine strategies were found. Readers identified two subproblems (failure to understand words and failure to understand clauses), two problem-solving strategies (use of context and use of re-reading), and five general comprehension strategies (synonym substitution, inferences, hypotheses, addition of information, and information from the story). Significant differences in use of strategies were found between proficient and non-proficient readers, between readers with high and low interest in their story, and between the two writing styles. Implications for a theory of reading as problem-solving, for teaching strategies, and for a case study approach to reading research are discussed. (Author/AA)

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Differences in Reading Strategies between Good and Poor Readers[1]

Dr. Jill Edwards Olshavsky

There is a need to improve the level of literacy in our country. We face a serious problem when, as Carroll and Chall (1975) report, many high school graduates cannot read at eighth grade level. Research has focused on factors that may inhibit reading ability such as low intelligence, brain damage, perceptual difficulties, emotional problems, retarded language development, and environmental and socio-economic factors (Wiener and Cromer, 1967). Little is known, however, about the difference in behavior of good and poor readers.

The main guidelines for improving literacy should come from an understanding of the reading process and the strategies readers

1. This article is based on a doctoral dissertation prepared under the direction of Professor

CS003301

use. All readers, including those at the high school level, should receive instruction and materials designed to meet their needs. All too often, however, students who fall behind their classmates in the primary grades never advance beyond an elementary reading level. The main reason is that they never receive easy reading assignments which allow them to develop their strategies. It is difficult to provide individualized instruction without an understanding of the reading behavior of poor readers and how it differs from the behavior of good readers. By understanding the role of strategies in reading and identifying strategies that are used by good readers, it would be possible to plan more effective remediation.

Purpose of the Study

The purpose of this research was to analyze differences in the strategies of good and poor readers. The first part of the study, therefore, was to identify strategies that readers employ.

A strategy was defined as a purposeful plan for obtaining meaning from print. For example, one reader could use a strategy of attempting to understand every word in a selection whereas another could read quickly to obtain the author's main point. Reading strategies reflect the reader's ability and purpose. Determining what reading strategies are available and the way they are used by good and poor readers provides new information about reading behavior.

Review of Literature

Research which has analyzed the reading process has been concerned mainly with analyzing the whole process in a general way. Two studies compared the responses of good and poor readers, and one analyzed the effect of material on reader's responses. None of the studies looked for evidence of strategy.

Retrospection studies of the reading process

The method of retrospection was used to analyze reading

by having a subject read a selection and then recall what he was doing and thinking as he read. One of the earliest retrospection reading studies (Huey, 1912) analyzed the effect of context on vocabulary interpretation. Piekarz (1956) used retrospection to compare the relation between process (subjects' responses about reading) and products (standardized test scores). Several literary experts employed retrospection to analyze subjects' responses to literature (Richards, 1939; Black, 1954; Squire, 1964; and Bishop, 1970). Piekarz and the literary experts identified a large number of responses made by subjects concerning what they did and thought as they were reading.

Retrospection studies comparing good and poor readers

Strang and Rogers (1965) compared the retrospective responses of 14 good and 14 poor eleventh grade readers to a short story. They found that good readers used a variety of approaches, delved below the surface level, and drew generalizations. Most of the

poor readers, however, were unable to describe their reading process, and most missed the theme of the story.

Smith (1967) compared the retrospective responses of 15 good and 15 poor twelfth grade readers who read for 2 purposes: details and general impressions. Smith concluded,

> . . .This study has shown that good readers have somehow learned to adjust their reading procedures to the purposes of details and general impressions better than poor readers have. (1967, p. 2)

More responses were recorded for the good readers than for the poor readers.

Retrospection study analyzing the effect of material

Fareed (1971) utilized a method similar to that of the Piekarz study to compare responses to history and biology selections. Fareed found that specialized vocabulary and interest lead to more unsolicited responses about biology than history

and affected the accuracy of responses to history more than to biology material. The reason for this finding may be that biology is a more highly specialized field than history. Therefore, most of Fareed's subjects could discuss history, but the only subjects who could discuss biology were those with specialized background knowledge.

The results of the 9 studies yielded over 50 categories of responses about reading behavior. The insights about the reading process afforded by these studies is invaluable. The findings have not received the attention they deserve, however, because of 2 problems with the studies. The first problem is that the studies lack a comprehensive theoretical framework. Therefore, the results are difficult to interpret, and implications for teaching and further research are not clear. The more major problem, however, is that the studies do not provide too much insight about reading behavior because they do not discuss strategy. For

example, even the results of the 2 studies which compared the responses of good and poor readers do not attempt to explain differences in their behavior. Harker concluded a review of such studies by stating,

> . . . Introspective-retrospective case studies clearly show that general principles are few and rare when the wide variability in the reading process of individuals is considered. While the scientific study of the reading process has undoubtedly been furthered by the use of models, the findings of introspective-retrospective case studies imply that the reading process may be considerably more complex and variable than its representation in current models suggests. (1974, p.95)

It is evident from Harker's interpretation that a means of organizing information about the reading process is necessary.

As an aid to interpretation of the responses provided by these studies, the 50 categories were reduced to 11 main types, and they were grouped as to whether they referred to the reader,

the reader's goal, the material, or an interaction of all 3. The categories are presented in Table 1.

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Insert Table 1 about here

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Theoretical Position

Current reading theory does not provide a framework for studying strategy. It is necessary to go outside the area of reading to psycholinguistic theory for an explanation of comprehension as a problem-solving process. A comprehensive model that could be applied to reading is suggested by the research of Clark (1975). Haviland and Clark (1974) developed a communication model called the Given-New comprehension strategy. Their strategy postulates that when a speaker/writer communicates with a listener/reader, he must identify that information which is already common knowledge, given information, and that which is new. He accomplishes this through syntactic structures. The listener/reader must

apply strategies to identify information for which he has an antecedent in memory and information which is new. When one strategy does not succeed, he applies another. By this method, the listener/reader is able to relate new information to his previous knowledge and thereby understand the speaker/writer's message.

The Given-New strategy has at least 2 implications for the study of the reading process. One implication is the application of the model of communication. By viewing the speaker/author and listener/reader as purposeful communicators, it becomes clear that their interest, background, and ability to establish a purpose are crucial factors influencing their communicative ability. For example, the listener's purpose is to extract new information and integrate it with prior information. If, however, the listener/reader is not interested in the information, or if he does not have the background information the speaker/author is assuming from his audience, the communication process will be incomplete.

The second implication of the Given-New strategy for reading comes from Haviland and Clark's view of communication as a problem-solving task (Newell and Simon, 1972)[2]. The receiver of information, a listener or reader, must purposefully interact with the message. Assuming the listener/reader is interested in obtaining the message, Haviland and Clark contend that he applies multiple strategies until one succeeds. Therefore, reading is perceived as a problem-solving task, and a good reader solves the problem using all available methods.

Both the reader's purpose and the material would be expected to influence the reader's behavior and use of strategies. Haviland and Clark (1974) demonstrated one way reading material can influence behavior. They found that subjects could comprehend

2. The Newell and Simon theory views man as an information-processing system. Behavior is a reflection of the interaction of key factors.

a sentence with a direct antecedent significantly faster than a sentence with an indirect antecedent. They concluded that when a direct antecedent was not present, the subject had to make an inference about the sentence. This extra inferential step took time and, therefore, as the Newell and Simon (1972) theory would predict, it represented a greater load on short term memory and made comprehension difficult.

Review of the Purpose

The purpose of this research was to understand the way good and poor readers interact with textual information to comprehend the author's message. This study analyzed strategies and, therefore, differed from previous research which only examined responses. This study also employed a comprehensive theoretical framework adapted from psycholinguistics. Because the approach was new, this research was exploratory.

By applying the Haviland and Clark communication model (1974)

to reading, the reader was viewed as a problem-solver who interacts with reading by using strategies. This model specified the interaction of crucial variables. Therefore, the focus of this research was on the strategies readers use to comprehend as they read. Because reading is not an isolated process, aspects of the reader's purpose and material were specified, and their effect on reading strategies was analyzed. This model, therefore, satisfies the need for a theoretical framework for analyzing reading.

The following is an example of a problem and the way a reader might apply a strategy. A reader encounters a word he does not know but whose meaning is important to the story. He recognizes this as a sub-problem of the main problem, comprehending the author's message. He then applies a strategy of attempting to define the word through context. If this does not succeed, he applies multiple strategies, i.e. using the dictionary or asking someone, until he obtains the meaning. Given the same sub-problem,

good and poor readers might apply different strategies. This research investigated the strategies good and poor readers applied to solve such sub-problems.

Questions of the Study

The main question of the study was: What differences exist in strategy between proficient and non-proficient readers? In order to answer this question it was first necessary to identify the types of strategies readers use as they read. Strategies are revealed particularly when readers fail to comprehend what they are reading. When readers are successful their strategies are not as evident. Strategies also reveal how readers make use of background conceptual and linguistic information and the process by which they interpret the author's message. Identification of reading strategies is important because it indicates what readers actually do to comprehend rather than what is hypothesized they should do. While previous research identified retrospective responses

about reading, this research analyzed readers' immediate responses in order to identify strategies.

The effect of the readers' ability on the use of reading strategies reveals information about the reading process. The Haviland and Clark (1974) research supports the Newell and Simon (1972) theory that the problem-solver's behavior is influenced by his capabilities. Haviland and Clark indicate that background information and the ability to apply it affect the reader's ability to comprehend because he has to search his memory for a relationship between the old and new information. It is also possible that good and poor readers differ in their understanding of their purpose in reading and apply different strategies or the same strategies in different ways.

Related questions

In what ways does the writing style of the material affect reading strategies? The reading material exerts many influences

on reading. The level of the material in terms of vocabulary and surface level syntactic complexity (as measured by readability formulas) as well as the content area influences reading behavior. A reader with material written far above his level about a subject with which he is unfamiliar will encounter major difficulties in terms of comprehending the author's information. Although these factors were investigated through a measure of the material's difficulty level and the reader's proficiency and interest, the variable to writing style was measured.

The effect of writing style of the material on readers' strategies is a major variable which has not been explored in terms of its effect on reading strategies. Bormuth (1967) stressed the need for research of variables which pertain not only to words and sentences but to paragraphs and entire selections because those are the levels at which reading occurs. The writing style of the author is one such variable. Haviland and Clark (1974) found that

sentences with indirect antecedents were more difficult to comprehend than those with direct antecedents. Therefore, the effect of 2 styles, one direct and one indirect, on reading strategies was analyzed.

In what ways does reader interest affect reading strategies? Interest in a topic is a third factor which would be expected to affect comprehension and perhaps a reader's use of strategies. Interest implies some amount of background knowledge; it also implies motivation. Haviland and Clark contend that the listener/reader applies multiple strategies to comprehend the speaker/writer's message. Interest in the topic would be expected to affect the reader's perseverence in applying strategies.

Methodology

Content analysis of readers' protocols was utilized to obtain information about readers' strategies. Protocols are records of continuous 'thinking aloud'. In this study, continuous verbalizing

was not possible and, therefore, a modified form was utilized whereby the subjects read and verbalized at designated points.

Protocol analysis helped overcome 2 major weaknesses which characterized the retrospection studies. The first weakness in retrospection is that the data is dependent on the ability of the reader to recall how he felt and what he thought about when he first read the material. The second weakness is that the subject's reports of impressions and thoughts during early parts of the material could be forgotten or biased by information at the end since the subject read the whole selection before discussing it. Learning studies using the retroactive inhibition paradigm have indicated that any activity, but especially one which is highly similar that is imposed between stimulus presentation and recall will interfere with recall (Munn, 1961).

Protocols collected during reading have several advantages. First, the subject relates his thoughts and reports on his behaviors

as they occur so they are less likely to be forgotten and are not biased by what he reads later. Second, the subject is more likely to say what he is thinking and not omit details or bias his response for the researcher as when making a summary statement. The weaknesses of protocols are, like retrospection, the responses are limited by the subject's ability to report his behavior. Unlike retrospection, the reading process must be interrupted while the subject describes what he is doing and thinking.

Operational definitions

Reader proficiency. Two types of readers, proficient and non-proficient were assessed with the Iowa Silent Reading Test, 1973, Level II, Form E, comprehension subtests A and B. Proficiency was defined as the ability to answer literal and inferential questions about reading material. Readers who scored in stanines 7, 8, and 9 were termed proficient readers. Farr states in the Guide for Interpretation and Use that students scoring in stanines 7, 8, and

9 can be considered to have earned above-average scores. Non-proficiency was defined as ability to comprehend only minimal amounts of information from material written at one's grade level. Scoring in stanine 3 or 4 was the criterion for a non-proficient or below average reader. Stanines "...represent equally spaced steps or units along a scale" (Farr, 1973, p. 15). Students who scored in stanines one and 2 were not considered because their reading was far below average, and those in stanines 5 and 6 were omitted to provide a difference between the proficient and non-proficient readers. The Iowa Silent Reading Test was administered to 90 students in 3 English classes by the researcher.

Reader interest. Interest was defined as inclination to read about a topic. The same 90 students who were administered the Iowa Silent Reading Test were given an interest inventory by their classroom teacher 2 weeks before the study. The teacher did not tell the students that the inventory was part of the study. The

students read one-sentence descriptions of short stories and rated each according to how interesting it was to them. An example of the descriptions is, "A story about a chimpanzee who is taken from his native home to a zoo." Each student's interest in each story was rated as high or low based on the results of the inventory.

Style of the material. The reading material, short stories, was rated as either abstract or straight-forward in writing style. The selection of writing styles was derived from the results of factor analytic research (Carroll, 1960). Carroll identified 8 different styles of writing pertaining to writers' surface structure, and this researcher selected abstract and straight-forward as the most distinct and easily defineable.

Abstract was defined as a writing style which is subtle, profound, and complex with deliberate use of obscure words and long, periodic sentences. It is often an original or unusual means of expressing an idea. This format often reflects the author's

personality.

Straight-forward was defined as a concrete, simple means of expressing an idea with shorter sentences and more familiar words in place of the complex words and sentences in the abstract style. This style is similar to journalistic writing: factual, simple, idiomatic, strong and clear. It is fairly anonymous, avoiding expression of the writer's thoughts and sentiments.

The style of the short stories used in the study was assessed by 6 expert raters including the researcher based on definitions of the 2 styles by Carroll (1960) and Flesch (1969). Fourteen potential short stories for the study were selected according to the criteria of length (approximately 2500 words) and readability level (tenth grade according to the Dale Chall 1948 formula). A story was accepted as one of the styles if 5 of the raters were in agreement with the researcher's rating. The probability of this agreement occuring by chance is less than one out of 20. Ten of

the stories, 6 abstract and 4 straight-forward, were accepted.

Design of the Study

The effects of the manipulated variables of reader interest and style of the story on the behavior of good and poor readers were explored. There were 2 levels of the variable of reader interest, high and low, and 2 levels of style, abstract and straight-forward. A description of the resulting 8 conditions is presented in Table 2.

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Subjects

The subjects, 15 boys and 9 girls, were selected from a group of 90 tenth grade students. The students were enrolled in 3 English classes in a high school in a small midwestern city. Tenth graders were selected to insure many had mastered the mechanics of reading, had been exposed to the content area of literature, and had the maturity to understand and follow instructions for a new procedure.

Because tenth graders must cope with differences in literary style in their English classes, it was expected that their reading behavior would reveal their strategies for reading literature.

Twenty-four subjects were selected, and 3 were assigned to each of the 8 conditions. When more than 3 subjects qualified for a given condition (6 instances), 3 were selected at random. Whenever possible, subjects who met the criteria and had the same interest rating on a story were selected. In this way, it was possible to limit the number of stories to 5 and thereby have more control over the story variable.

Procedure

Data collection. The data consisted of the subjects' verbal protocols about their reading behavior and their verbal retelling of a story. This data was tape recorded. The procedure for data collection involved 7 steps. Each subject was: (a) questioned about his reading behavior, (b) introduced to the purpose of the

study, (c) given directions and a practice session in which he read one story silently and paused after each independent clause (marked by a red dot) to describe his interpretation and reading behavior, (d) given the story, (e) asked to retell the story (procedure in Goodman and Burke Reading Miscue Inventory, 1972), (f) asked to discuss the story and his reading behavior informally, and (g) asked to complete an interest inventory on the story read. The purpose of the second interest inventory was to assess whether reading the story affected the subject's previous rating of his interest in the topic.

Data analysis. The responses readers made as they read were analyzed for evidence of reading strategy. Each subject's protocol and retelling data were analyzed. The protocols were transcribed, compared with the corresponding clauses in the story, and categorized using content analysis procedure. After all the clauses were categorized, the resulting categories were then further organized into

a Taxonomy according to their relationship to words, clauses, or the entire story.

The reliability of the researcher's assignment of responses to categories was assessed by the researcher and 3 other raters. The researcher classified the protocols of 6 subjects and obtained 88% agreement with the original classification. Each of the 3 raters agreed with at least 80% of the researcher's original classifications of one of the 6 subject's responses. In addition, the responses were compared with the results of previous studies of the reading process, and high agreement was found.

In order to identify significant differences in use of responses, the Fisher exact probability test was used. The number of times a group made one of the responses was compared with the average occurrence of that response over all subjects.

The subjects' retellings were analyzed using the Goodman and Burke (1972) procedure. Each retelling was scored from 0 to 100

points depending on the subjects' inclusion of the following aspects of the story: character analysis, recall (15 points), development (15 points); events (30 points); plot (20 points); and theme (20 points).

Results

Types of strategies readers employ

In order to answer the main question concerning differences in strategy between proficient and non-proficient readers, it was first necessary to identify strategies used by all the readers. Thirteen types of responses were identified by applying content analysis to the subjects' verbal protocols. These responses pertained to words, clauses, and the story and were organized into a taxonomy (presented in Table 3) according to these surface level structures.

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Of the 13 responses, 9 represented reading strategies. Three main types of reading strategies were classified: identification of a sub-problem, problem-solving strategies, and general comprehension strategies.

Readers identified 2 types of sub-problems, failure to understand words and failure to understand clauses. Examples of these sub-problems were, "I'm puzzled by this word here- devasted" (referring to a word) and "I don't understand this part about Miss Gavin." (referring to a clause).

Identification of these sub-problems lead to specific strategies to solve the problem. The response of failure to comprehend a word was associated with one particular problem-solving strategy, use of context. An example of this response is, "I don't know what sod means ... I guess sod would be packed in dirt or something." In this case, the subject obtained more information about sod, i.e., how it was used to build houses, which helped her define it.

Failure to understand a clause was associated with another strategy, re-reading. For example, "This part doesn't fit, I'm going to read it again."

Five other reader responses were identified which did not occur in response to specific sub-problems but were important strategies in aiding comprehension. Related to words was the strategy of synonym substitution. With this strategy, the reader substituted a familiar or meaningful synonym for the word in the text when paraphrasing the clause. An example was substituting candle holder for candelabrum. This strategy appeared to facilitate the reader's memory because it transformed an unfamiliar word to a familiar word and, in some cases, reduced ambiguity.

The next 3 strategies pertain to clauses. With the strategy of forming an inference, the reader read beyond the information presented in the story. For example, in a story about a plague, one reader inferred that one of the characters had contracted the

disease, and he responded, "I think he's really got it". The second strategy pertaining to clauses was addition of information. With this strategy, the reader retrieved related information from memory and applied it to the story. For example, one subject responded, "I once saw a movie like this." The third strategy pertaining to clauses was hypothesis formulation. For this strategy, the subject predicted what was about to occur in the story. For example, one subject hypothesized, "...he must be gonna get a loan to start his house."

The last strategy to be discussed pertains to the story. With this strategy, subjects integrated available information from the title and from the story and made inferences and hypotheses about the entire story. For example, one subject responded, "Sounds like a big city cause of the dust."

The Taxonomy revealed the high frequency of occurrence of most of the 9 strategies. By analyzing responses into strategies,

it was seen that readers identified 2 reading problems and had a solution for each. This implied problem-solving activity in reading. The high frequency of the 5 general comprehension strategies also indicated that the readers were interacting with the author's message. With synonym substitution, the readers changed the surface structure and with hypotheses, inferences, addition of information, the reader expanded the author's message.

The remaining responses did not appear to represent specific reading strategies. In Behavior related to words, the response of phoneme-grapheme miscue referred to the substitution of a word in the text with one that was phonemically or graphically similar. For example, to the sentence, "There were seven- an imperial suite", one subject replied, "Something was sweet." The subjects seemed to be unaware of their miscues indicating they occur in thinking and silent reading as well as the oral reading behavior Goodman (1970) has documented.

Under Behavior related to clauses, the response of verbatim repetition occurred when the subject's response was a repetition of part or all of the clause without any personal comment about the meaning. The other response, paraphrasing, occurred in response to the directions to summarize the story after each independent clause (marked by a red dot). The summaries or paraphrases were scored as to whether they were accurate and preserved the author's meaning or inaccurate and contained confused or incorrect information. They were also classified as literal, translations of the factual information or inferential, additions of information and inferences.

A comparison of the results of this study with those of previous studies in Table 1 reveals similarities in several of the responses. The similarities lend validity to these methods of studying the reading process. It appeared that by asking readers about their behavior, information about reading behavior that applies to

many readers was gained.

Differences in strategy

The responses of the proficient and non-proficient readers were compared to determine whether there were any significant differences in their reading strategy. It was found that proficient readers used 4 strategies significantly more often than non-proficient readers.

Identification of a sub-problem: Stating failure to understand a word. Significantly more proficient readers than non-proficient readers made this response (12-6, significant at the .01 level). Also more proficient readers had more (but not significantly more) than the average number of responses than non-proficient readers.

Problem-solving strategies: Use of context to define a word. Significantly more proficient readers than non-proficient readers made this response (5-0, significant at the .05 level). Significantly more proficient than non-proficient readers had more than the average number of this response (5-0, significant at the .05 level).

Problem-solving strategies: Re-reading to comprehend a clause. Significantly more proficient readers than non-proficient readers made this response (7-2, significant at the .05 level). The 2 groups did not differ, however, in the number of responses above the group mean.

Problem-solving strategies: Comprehension strategies. Significantly more proficient than non-proficient readers made the response of addition of general information (4-0, significant at the .05 level). Significantly more proficient than non-proficient readers had more than the average number of this response (4-0, significant at the .05 level).

Other differences between proficient and non-proficient readers were noted in their retelling scores and their attitudes and interests toward reading. The average retelling score for the proficient readers was 91.50 and 60.25 for the non-proficient readers. In the initial subject interviews, the proficient readers expressed

more interest in reading a variety of materials and reported reading more often than the poor readers.

Related questions

Effect of writing style on reading strategies. The responses of readers with abstract style material were compared with those of readers with straight-forward style material to determine if there were any significant differences in their reading strategy. It was found that style affected ability to paraphrase clauses and that readers with abstract style material used 2 of the strategies significantly more often than those with straight-forward style material.

Identification of a sub-problem: Failure to understand a clause. Significantly more readers with abstract style stories than straight-forward style stories made this response (10-4, significant at the .025 level). Significantly more readers with abstract style material had responses greater than the mean (7-0,

significant at the .005 level).

Comprehension strategies. For the strategy of inference, significantly more readers with abstract style material had responses greater than the mean (9-1, significant at the .005 level). The comparison of the number of readers who made the responses in each group was not significant (10-6).

Paraphrasing. With accurate literal paraphrases, readers with a straight-forward style story had significantly more responses above the group mean than those with an abstract style story (7-2, significant at the .05 level). There was no difference in the number of readers who made the response.

For inaccurate inferential paraphrases, significantly more readers with an abstract style story made the response than those with straight-forward style stories (7-1, significant at .025 level). Also, when the number of responses by each reader with abstract and straight-forwrd material was compared with the group mean,

significantly more readers with abstract style material had responses greater than the mean (6-0, significant at the .01 level). Readers with abstract material made significantly more inferential paraphrases (accurate and inaccurate combined) than those with straight-forward style material (7-1, significant at .025 level).

There were no significant differences in use of inaccurate literal paraphrases or accurate inferential paraphrases.

Effect of interest on reading strategies. The responses of readers were compared for those who rated the topic of their story as interesting and those who rated it as not interesting. There was a significant difference in one of the strategies and in paraphrasing responses.

Identification of a sub-problem: Failure to understand a word. Significantly more readers with a story they rated as highly interesting had more than the group mean number of this response (6-1, significant at the .05 level). The same number of readers in each

group made this response (9), but those with a story they rated as highly interesting used this strategy significantly more often.

Paraphrasing. Readers with stories they rated as not interesting had significantly more accurate literal paraphrases than the group average (7-2, significant at the .05 level). All of the readers in each group made this response.

It was found that almost all the readers used each of the strategies at least once. Therefore, readers do not differ in their repetoire of strategies, but they do differ in the frequency with which they apply them. The good readers identified the sub-problem of failure to understand a word and applied the problem-solving strategy of use of context to define it. They re-read more often, and they added general information. The writing style of the material appeared to cause reading difficulty. Readers with abstract material had more responses of failure to understand a clause, and they made more inferences but also had more inaccurate inferential paraphrases.

Those with straight-forward style material had more accurate literal paraphrases. Interest affected focus on words. Readers who rated their story as highly interesting used the strategy of stating failure to understand a word. Readers who rated their story as not interesting had more accurate literal paraphrases.

Discussion

The types of responses readers made during their reading of a short story provided evidence of their thought processes. By analyzing these responses as reading strategies, it was obvious that the readers employed a problem-solving approach to comprehend the author's message. They identified sub-problems that impeded their progress in solving the main problem, understanding the story. And they employed a problem-solving strategy to overcome the problem. The readers also employed 5 general comprehension strategies in which they changed or added to the author's literal meaning by applying their background knowledge or anticipating the author's meaning.

The protocols portrayed the reading process as creative problem-solving wherein the reader interacts with the material according to his interest and ability.

A comparison of the responses found in this study and those from the retrospection studies (Table 1) reveals enough similarity to conclude that the same processes were observed. The summary of previous results and the results of this study indicate that readers use personal judgment and experience, identify words from context, anticipate events, and make inferences. This seems to provide ample evidence that reading is not a simple decoding process but that readers interact with material to achieve their goal.

Comparison of good and poor readers

The results indicate that good readers have a greater sense of purpose for reading and that they are better able to apply their background knowledge to the reading setting. The good readers used both of the identified problem-solving strategies significantly

more often than the poor readers. This indicated that they identify sub-problems, and they have and use efficient strategies for obtaining meaning.

The finding that good readers apply general information more frequently than poor readers could be explained in 2 ways. Either they have more background information that is appropriate to reading or they are better able to apply information. The first explanation implies educational experience, the second implies strategy. Haviland and Clark's (1974) research predicts that having and being able to recall the background knowledge the author assumes aides reading speed and therefore comprehension. Good readers appear to utilize strategies to aid comprehension.

Effect of style on the reading process

The effect of style of material on reading has not been widely investigated and is not measured by readability formulas. This research clearly demonstrated, however, that abstract writing styles

make reading difficult for both good and poor readers. It may even be concluded that it is possible to make a good reader look non-proficient by giving him material written abstractly. Abstract stories caused the readers to state failure to comprehend, draw inferences, and make inaccurate inferential paraphrases. The straight-forward stories lead to accurate literal paraphrases.

The findings support the Haviland and Clark (1974) conclusion that information without a direct antecedent requires an inferential step to reach information in memory. This was found to be true for the stories written in an abstract style. The typical behavior when a reader encountered the need for an inference was first a statement that he did not comprehend the clause, then re-thinking or re-reading to form a connection between the author's statement and his knowledge (as Goodman postulates, 1970), forming an inference, then making an inferential paraphrase. Many of the inferential paraphrases were incorrect because they required time (interferred with the

subject's short term memory) or because they required an interpretation and extension of the author's meaning.

Effect of interest on the reading process

The results indicate that interest affects the use of the strategy, identifying failure to comprehend a word. Interest may motivate the reader to want to get every word. One of the subjects, a good reader, reported during the interview that she enjoyed reading slowly and liked to think about every word the author used.

Readers who were not interested made significantly more accurate literal paraphrases. This finding may indicate that readers who are not interested in a story are content to read at a literal level. They may have had the goal of accurately paraphrasing the clauses as per the directions but may not have had a goal of thoroughly exploring the author's theme. Interest appeared to influence the level of involvement the readers chose to pursue.

The results support the Haviland and Clark (1974) research that comprehension involves understanding new information in terms of previous knowledge. Also reading behavior appears to be the result of the interaction of a reader with his ability (background experience and repertoire of successful strategies), his goals (following directions or genuine interest in the material), and the reading material (level of difficulty and writing style). It is probably not possible to predict reading behavior without specifying the effect of these influencing factors.

Implications

Theoretical

Analysis of reading as a problem-solving task provided useful insights about strategies. It was found that strategies were employed to solve the main problem, obtaining the author's message, to solve sub-problems that impede the process, and to aid comprehension. The strategies are necessitated by information-processing constraints. For example, a reader does not always comprehend a clause the first

time he reads it. Therefore, he must develop a strategy that enables him to comprehend. It appears that a good reader is one who is able to apply effective strategies frequently.

The Haviland and Clark (1974) theory of comprehension applied to reading provides a more comprehensive theory than any existing one. Although the Goodman theory (1970) is a widely recognized process theory, it is somewhat limited by a pre-structured view of the reading process derived from Chomsky's transformational grammar. Research based on the Goodman theory focuses on analysis of the reader's use of grapho-phonemic, syntactic and semantic cueing systems. Other reader/text variables are not defined. In this exploratory research, a more comprehensive theoretical framework was employed in an attempt to investigate the effect of several variables other than linguistic which affect reading behavior. As a result, more strategies than Goodman discusses were identified, and the results imply that reading is a problem-solving process. A theory of reading

as problem-solving leads to focus on reader strategies, how they are developed, the processes they represent, and how good strategies can be taught. Specific strategies readers use can be investigated to gain insights about the process and how it is influenced by reader and text variables. In addition, if reading is approached as problem-solving, other theories of problem solving (Newell and Simon, 1972) can be applied to reading investigation.

Pedagogical

Several initial practical implications of this research may be discussed. One observation is that the strategies which were identified are not usually taught to beginning or remedial readers. Although many teachers emphasize reading as a goal-oriented or purposeful process, they do not teach readers to identify reading problems and utilize strategies to solve them. Most instruction focuses on isolated skills for decoding words or using context to replace an unknown word with an exact synonym. The results of this exploratory

study indicated that proficient readers respond at the clause and story level and focus on obtaining the author's message. Knowledge of the strategies which are actually used by readers and of the differences in use of strategies by proficient and non-proficient readers has implications for teaching.

The findings concerning the factor of interest also have implications for teaching. It was found that an inventory in which subjects rate their interest in topics does not adequately assess reading interest because interest is influenced by the reader's ability to read the material, i.e. his proficiency and the writing style of the material. Therefore, an indepth analysis of factors of the reader and the material rather than an inventory of topics of interest alone should probably be used to assess reading interest.

The results indicate that a readability formula such as the Dale Chall (1948) which only measures surface structure elements (familiarity of vocabulary and sentence length) does not account

for the effect of writing style or predict the effect of reader-material interaction. Each of the stories used in the study was rated as tenth grade level with the Dale Chall formula, but the author's writing style was found to affect the subjects' retelling scores and use of response strategies. The abstract style stories were more difficult to comprehend than the stories with a straight-forward style. Factors other than those assessed with a formula should be considered in predicting a subject's ability to comprehend a given piece of writing.

Research

The results of this study raise several issues for further research: (a) can reading strategies be taught? (b) what is the effect of the title of a selection on reading strategies? (c) do reading strategies differ with the age of the reader? (d) is it possible to increase proficiency with appropriate reading material? Each of these questions should be explored by analyzing readers' processes.

The methodology, content analysis applied to readers' protocols, has many implications for further research. An extremely useful technique for obtaining information about readers' thought processes and strategies, this method can be applied to other research of the reading process. With most research in which the effect of an instructional method or material is investigated, standardized reading test scores are relied upon to gage the subjects' performance. By analyzing protocols, detailed information about changes in reading behavior can be obtained. Content analysis requires a great deal of time per subject and, therefore, sample sizes are restricted. It is possible, however, to utilize this method with a subset of subjects in a large sample in order to obtain process data. Content analysis also requires the researcher to make judgments about categories. The results can be highly valid and reliable, however, if rigid category names are developed and maintained.

It is necessary to obtain information about the way reading

occurs to develop sound theory and instructional practices. Research which is exploratory, broad in scope, and based on a comprehensive theory can uncover aspects of the reading process. There is a need for research that identifies more variables for investigation rather than attempting to reduce those which have been recognized. Only by exploring all possible areas can any process be fully understood.

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Table 1

Categories of responses from 9 studies

Categories	Studies								
	Bishop	Black	Fareed	McCallister	Piekarz	Richards	Smith	Squire	Strang & Rogers
I. Reader									
1. Keep details suspended in memory (ability to remember and apply details)							X	X	
2. Associate words and ideas from prior experience and knowledge (ability to remember and apply vocabulary and ideas from previous experience or knowledge)		X	X	X				X	X
3. Reproduction (repetition of a detail)			X		X	X		X	
II. Reader's goal									
1. Determination to achieve certainty in interpretation (ability to accept hypotheses about meaning)								X	
2. Personal judgment (ability to analyze information in light of one's own experience)	X		X		X	X	X		X
III. Material									
1. Literary response (ability to analyze information by using terms of literary analysis)		X	X			X			X

Table 1 continued

Categories of responses from 9 studies

Categories	Studies								
	Bishop	Black	Fareed	McCallister	Piekarz	Richards	Smith	Squire	Strang & Rogers
IV. Interaction of reader, goal, and material									
1. Identify words and ideas from context (ability to use context to identify words and information)					X	X			X
2. Illumination (ability to make inferences)			X	X	X			X	
3. Identify main idea (ability to identify the theme of written information)					X			X	X
4. Infer author's purpose (ability to identify the author's purpose)		X			X	X			X
5. Anticipation of ideas or events (ability to form hypotheses							X		

Table 2

Descriptions of the 8 conditions

Condition	Reader Proficiency	Reader Interest	Style of Material
1	Proficient	High	Abstract
2	Proficient	Low	Abstract
3	Proficient	High	Straight-Forward
4	Proficient	Low	Straight-Forward
5	Non-Proficient	High	Abstract
6	Non-Proficient	Low	Abstract
7	Non-Proficient	High	Straight-Forward
8	Non-Proficient	Low	Straight-Forward

Table 3

Taxonomy

Categories of Response	Number
I. Behavior related to words	
1. Stating failure to understand a word	80
2. Phoneme-grapheme miscue	21
3. Synonym substitution	267
4. Use of context	7
II. Behavior related to clauses	
1. Stating failure to understand a clause	38
2. Re-reading	30
3. Verbatim repetition	53
4. Paraphrasing	
a.1. accurate literal	2038
2. inaccurate literal	157
b.1. accurate inferential	411
2. inaccurate inferential	26
5. Inference	101
6. Addition of information	
a. general	6
b. personal	51
c. story	39
7. Hypotheses	104
III. Behavior related to story	
1. Information about the story	13
2. Description of the story	9